

SEQUENCE LISTING

<110> Fritsch Olivier
Hohn Barbara
Lucht Jan Martin

<120> GENE FOR INCREASED SOMATIC RECOMBINATION

<130> 1-32546B/FMI

<140> 10/519,069

<141> 2004-12-27

<150> PCT/EP03/006757

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<150> GB 0214896

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<160> 30

<170> FastSEQ for Windows Version 4.0

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Asn Ala Ser Ser Lys Lys Arg Lys Arg Trp Thr Glu Ala Glu Asp Ala	
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Gly	Val	Cys	Asn	Val	Arg	Gly	Thr	Asp	Met	Pro	Ser	Pro	His	Gly	Val
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Pro	Ile	Asp	Leu	Leu	Asp	Arg	Leu	Val	Ile	Ile	Arg	Thr	Gln	Ile	Tyr
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Asp	Pro	Ser	Glu	Met	Ile	Gln	Ile	Ile	Ala	Ile	Arg	Ala	Gln	Val	Glu
	370				375						380				
Glu	Leu	Thr	Val	Asp	Glu	Gly	Cys	Leu	Val	Leu	Leu	Gly	Glu	Ile	Gly
385					390					395					400
Gln	Arg	Thr	Ser	Leu	Arg	His	Ala	Val	Gln	Leu	Leu	Ser	Pro	Ala	Ser
			405						410					415	
Ile	Val	Ala	Lys	Met	Asn	Gly	Arg	Asp	Asn	Ile	Cys	Lys	Ala	Asp	Ile
		420					425						430		
Glu	Glu	Val	Thr	Ser	Leu	Tyr	Leu	Asp	Ala	Lys	Ser	Ser	Ala	Lys	Leu
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Met	Ala	Glu	Leu	Lys	Leu	Ser	Glu	Ser	Arg	Asp	Leu	Thr	Arg	Val	Glu	
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cga	atc	ggc	gca	cac	tca	cac	atc	aga	gga	cta	ggt	ctc	gac	tct	gcc	96
Arg	Ile	Gly	Ala	His	Ser	His	Ile	Arg	Gly	Leu	Gly	Leu	Asp	Ser	Ala	
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Leu Glu Pro Arg Ala Val Ser Glu Gly Met Val Gly Gln Val Lys Ala	
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cggt aaa gcc gcc ggt gta atc ctt cag atg att aga gaa ggg aaa atc	192
Arg Lys Ala Ala Gly Val Ile Leu Gln Met Ile Arg Glu Gly Lys Ile	
50 55 60	
gcg ggt ccg gct att cta ata gcg ggt caa ccc gga acg ggt aag aca	240
Ala Gly Arg Ala Ile Leu Ile Ala Gly Gln Pro Gly Thr Gly Lys Thr	
65 70 75 80	
gcg att gca atg ggt atg gcg aaa tct ctt ggc ttg gaa act cct ttt	288
Ala Ile Ala Met Gly Met Ala Lys Ser Leu Gly Leu Glu Thr Pro Phe	
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gcg atg att gca gga agt gaa att ttc tca tta gag atg tca aag aca	336
Ala Met Ile Ala Gly Ser Glu Ile Phe Ser Leu Glu Met Ser Lys Thr	
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gaa gct ttg act cag tct ttt cgt aaa gcg att ggt gtt agg atc aaa	384
Glu Ala Leu Thr Gln Ser Phe Arg Lys Ala Ile Gly Val Arg Ile Lys	
115 120 125	
gaa gag aca gag gtt att gaa gga gaa gtt gtt gag gtt cag att gat	432
Glu Glu Thr Glu Val Ile Glu Gly Glu Val Val Glu Val Gln Ile Asp	
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Arg Pro Ala Ser Ser Gly Val Ala Ser Lys Ser Gly Lys Met Thr Met	
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Lys Thr Thr Asp Met Glu Thr Val Tyr Asp Met Gly Ala Lys Met Ile	
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Glu Ala Leu Asn Lys Glu Lys Val Gln Ser Gly Asp Val Ile Ala Ile	
180 185 190	
gat aaa gct act ggg aag att act aag ctt gga aga tcg ttt tcg agg	624
Asp Lys Ala Thr Gly Lys Ile Thr Lys Leu Gly Arg Ser Phe Ser Arg	
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Ser Arg Asp Tyr Asp Ala Met Gly Ala Gln Thr Lys Phe Val Gln Cys	
210 215 220	
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Pro Glu Gly Glu Leu Gln Lys Arg Lys Glu Val Val His Cys Val Thr	
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Leu His Glu Ile Asp Val Ile Asn Ser Arg Thr Gln Gly Phe Leu Ala	
245 250 255	
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Leu Phe Thr Gly Asp Thr Gly Glu Ile Arg Ser Glu Val Arg Glu Gln	
260 265 270	
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Ile	Asp	Thr	Lys	Val	Ala	Glu	Trp	Arg	Glu	Glu	Gly	Lys	Ala	Glu	Ile		
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Val	Pro	Gly	Val	Leu	Phe	Ile	Asp	Glu	Val	His	Met	Leu	Asp	Ile	Glu		
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tgc	ttc	tca	ttc	ctt	aac	cga	gct	cta	gaa	aac	gaa	atg	tca	cca	atc	960	
Cys	Phe	Ser	Phe	Leu	Asn	Arg	Ala	Leu	Glu	Asn	Glu	Met	Ser	Pro	Ile		
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ctt	gtg	gtg	gca	aca	aac	cga	gga	gtg	acg	aca	atc	cgt	ggc	aca	aac	1008	
Leu	Val	Val	Ala	Thr	Asn	Arg	Gly	Val	Thr	Thr	Ile	Arg	Gly	Thr	Asn		
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cag	aaa	tca	cca	cac	ggg	atc	ccg	att	gat	ctc	ctt	gac	cgt	ctt	ctc	1056	
Gln	Lys	Ser	Pro	His	Gly	Ile	Pro	Ile	Asp	Leu	Leu	Asp	Arg	Leu	Leu		
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Ile	Ile	Thr	Thr	Gln	Pro	Tyr	Thr	Asp	Asp	Asp	Ile	Arg	Lys	Ile	Leu		
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gaa	atc	cgt	tgc	caa	gag	gaa	gac	gtt	gag	atg	aac	gaa	gag	gcc	aaa	1152	
Glu	Ile	Arg	Cys	Gln	Glu	Glu	Asp	Val	Glu	Met	Asn	Glu	Glu	Ala	Lys		
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Gln	Leu	Leu	Thr	Leu	Ile	Gly	Arg	Asp	Thr	Ser	Leu	Arg	Tyr	Ala	Ile		
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cat	ctt	ata	acc	gca	gct	gca	ttg	tca	tgc	cag	aaa	cgg	aaa	ggg	aaa	1248	
His	Leu	Ile	Thr	Ala	Ala	Ala	Leu	Ser	Cys	Gln	Lys	Arg	Lys	Gly	Lys		
				405					410					415			
gtc	gtg	gag	gtt	gag	gat	att	cag	aga	gtt	tac	aga	ctg	ttc	ttg	gat	1296	
Val	Val	Glu	Val	Glu	Asp	Ile	Gln	Arg	Val	Tyr	Arg	Leu	Phe	Leu	Asp		
			420					425					430				
gtg	agg	aga	tcg	atg	cag	tat	ctt	gtt	gag	tat	cag	agt	cag	tat	atg	1344	
Val	Arg	Arg	Ser	Met	Gln	Tyr	Leu	Val	Glu	Tyr	Gln	Ser	Gln	Tyr	Met		
		435				440						445					
ttc	agt	gaa	cca	atc	aaa	aac	gat	gaa	gct	gct	gca	gaa	gac	gaa	caa	1392	
Phe	Ser	Glu	Pro	Ile	Lys	Asn	Asp	Glu	Ala	Ala	Ala	Glu	Asp	Glu	Gln		
	450					455					460						
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Asp	Ala	Met	Gln	Ile	*												
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Leu	Glu	Pro	Arg	Ala	Val	Ser	Glu	Gly	Met	Val	Gly	Gln	Val	Lys	Ala	35	40	45	
Arg	Lys	Ala	Ala	Gly	Val	Ile	Leu	Gln	Met	Ile	Arg	Glu	Gly	Lys	Ile	50	55	60	
Ala	Gly	Arg	Ala	Ile	Leu	Ile	Ala	Gly	Gln	Pro	Gly	Thr	Gly	Lys	Thr	65	70	75	80
Ala	Ile	Ala	Met	Gly	Met	Ala	Lys	Ser	Leu	Gly	Leu	Glu	Thr	Pro	Phe	85	90	95	
Ala	Met	Ile	Ala	Gly	Ser	Glu	Ile	Phe	Ser	Leu	Glu	Met	Ser	Lys	Thr	100	105	110	
Glu	Ala	Leu	Thr	Gln	Ser	Phe	Arg	Lys	Ala	Ile	Gly	Val	Arg	Ile	Lys	115	120	125	
Glu	Glu	Thr	Glu	Val	Ile	Glu	Gly	Glu	Val	Val	Glu	Val	Gln	Ile	Asp	130	135	140	
Arg	Pro	Ala	Ser	Ser	Gly	Val	Ala	Ser	Lys	Ser	Gly	Lys	Met	Thr	Met	145	150	155	160
Lys	Thr	Thr	Asp	Met	Glu	Thr	Val	Tyr	Asp	Met	Gly	Ala	Lys	Met	Ile	165	170	175	
Glu	Ala	Leu	Asn	Lys	Glu	Lys	Val	Gln	Ser	Gly	Asp	Val	Ile	Ala	Ile	180	185	190	
Asp	Lys	Ala	Thr	Gly	Lys	Ile	Thr	Lys	Leu	Gly	Arg	Ser	Phe	Ser	Arg	195	200	205	
Ser	Arg	Asp	Tyr	Asp	Ala	Met	Gly	Ala	Gln	Thr	Lys	Phe	Val	Gln	Cys	210	215	220	
Pro	Glu	Gly	Glu	Leu	Gln	Lys	Arg	Lys	Glu	Val	Val	His	Cys	Val	Thr	225	230	235	240
Leu	His	Glu	Ile	Asp	Val	Ile	Asn	Ser	Arg	Thr	Gln	Gly	Phe	Leu	Ala	245	250	255	
Leu	Phe	Thr	Gly	Asp	Thr	Gly	Glu	Ile	Arg	Ser	Glu	Val	Arg	Glu	Gln	260	265	270	
Ile	Asp	Thr	Lys	Val	Ala	Glu	Trp	Arg	Glu	Glu	Gly	Lys	Ala	Glu	Ile	275	280	285	
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Cys	Phe	Ser	Phe	Leu	Asn	Arg	Ala	Leu	Glu	Asn	Glu	Met	Ser	Pro	Ile	305	310	315	320
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Gln	Lys	Ser	Pro	His	Gly	Ile	Pro	Ile	Asp	Leu	Leu	Asp	Arg	Leu	Leu	340	345	350	
Ile	Ile	Thr	Thr	Gln	Pro	Tyr	Thr	Asp	Asp	Asp	Ile	Arg	Lys	Ile	Leu	355	360	365	
Glu	Ile	Arg	Cys	Gln	Glu	Glu	Asp	Val	Glu	Met	Asn	Glu	Glu	Ala	Lys	370	375	380	
Gln	Leu	Leu	Thr	Leu	Ile	Gly	Arg	Asp	Thr	Ser	Leu	Arg	Tyr	Ala	Ile	385	390	395	400
His	Leu	Ile	Thr	Ala	Ala	Ala	Leu	Ser	Cys	Gln	Lys	Arg	Lys	Gly	Lys	405	410	415	
Val	Val	Glu	Val	Glu	Asp	Ile	Gln	Arg	Val	Tyr	Arg	Leu	Phe	Leu	Asp	420	425	430	
Val	Arg	Arg	Ser	Met	Gln	Tyr	Leu	Val	Glu	Tyr	Gln	Ser	Gln	Tyr	Met	435	440	445	
Phe	Ser	Glu	Pro	Ile	Lys	Asn	Asp	Glu	Ala	Ala	Ala	Glu	Asp	Glu	Gln	450	455	460	
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 Ser His Ile Arg Gly Leu Gly Leu Asp Ser Val Leu Glu Pro Arg
 1 5 10 15

 gcc gta tcc gaa gga atg gtt ggt caa atc aaa gca cgt aaa gcc gcc 156
 Ala Val Ser Glu Gly Met Val Gly Gln Ile Lys Ala Arg Lys Ala Ala
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 gga gta acc ctc gag ttg atc aga gac ggc aaa atc tcg ggt cgg gct 204
 Gly Val Thr Leu Glu Leu Ile Arg Asp Gly Lys Ile Ser Gly Arg Ala
 35 40 45

 ata ctt ata gcg ggt caa ccc gga acg ggt aaa atc gca ata gca atg 252
 Ile Leu Ile Ala Gly Gln Pro Gly Thr Gly Lys Ile Ala Ile Ala Met
 50 55 60

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 Gly Ile Ala Lys Ser Leu Gly Gln Glu Thr Pro Phe Thr Met Ile Ala
 65 70 75

 gga agt gag atc ttt tct tta gag atg tca aag act gaa gct tta act 348
 Gly Ser Glu Ile Phe Ser Leu Glu Met Ser Lys Thr Glu Ala Leu Thr
 80 85 90 95

 caa gct ttt cgt aaa gct att ggt gtt agg atc aaa gaa gag act gac 396
 Gln Ala Phe Arg Lys Ala Ile Gly Val Arg Ile Lys Glu Glu Thr Asp
 100 105 110

 gtg ata gaa gga gaa gtt gtg acg att tcg att gat aga cct gct tct 444
 Val Ile Glu Gly Glu Val Val Thr Ile Ser Ile Asp Arg Pro Ala Ser
 115 120 125

 tct ggt ggt tct gtg aag aag act ggg aag ata aca atg aag acg act 492
 Ser Gly Gly Ser Val Lys Lys Thr Gly Lys Ile Thr Met Lys Thr Thr
 130 135 140

 gat atg gaa tct aat ttt gat ttg gga tgg aaa ttg att gag cca ttg 540
 Asp Met Glu Ser Asn Phe Asp Leu Gly Trp Lys Leu Ile Glu Pro Leu
 145 150 155

 gat aag gag aaa gta cag agt ggt gat gtt att gtt ttg gat agg ttt 588
 Asp Lys Glu Lys Val Gln Ser Gly Asp Val Ile Val Leu Asp Arg Phe
 160 165 170 175

 tgt ggg aag att act aag ctt gga aga tct ttt acg agg tct aga gat 636
 Cys Gly Lys Ile Thr Lys Leu Gly Arg Ser Phe Thr Arg Ser Arg Asp
 180 185 190

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Phe Asp Val Met Gly Ser Lys Thr Lys Phe Val Gln Cys Pro Glu Gly	
195 200 205	
gag ctt gag aag agg aag gag gtt ttg cat tct gtc aca ctt cat gag	732
Glu Leu Glu Lys Arg Lys Glu Val Leu His Ser Val Thr Leu His Glu	
210 215 220	
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Ile Asp Val Ile Asn Ser Arg Thr Gln Gly Tyr Leu Ala Leu Phe Thr	
225 230 235	
ggg gat aca ggc gag att cgt tca gaa acc cga gag caa agc gat act	828
Gly Asp Thr Gly Glu Ile Arg Ser Glu Thr Arg Glu Gln Ser Asp Thr	
240 245 250 255	
aaa gtg gca gag tgg aga gaa gaa ggg aaa gct gaa ata gta cct ggt	876
Lys Val Ala Glu Trp Arg Glu Glu Gly Lys Ala Glu Ile Val Pro Gly	
260 265 270	
gtt ctc ttc att gat gaa gtc cat atg ctt gat atc gaa tgc ttc tct	924
Val Leu Phe Ile Asp Glu Val His Met Leu Asp Ile Glu Cys Phe Ser	
275 280 285	
ttc ctg aat aga gct ctc gaa aac gat atg tca cca atc ctg gtc gtg	972
Phe Leu Asn Arg Ala Leu Glu Asn Asp Met Ser Pro Ile Leu Val Val	
290 295 300	
gct aca aac aga gga atg aca aca atc cga gga aca aac cag ata tca	1020
Ala Thr Asn Arg Gly Met Thr Thr Ile Arg Gly Thr Asn Gln Ile Ser	
305 310 315	
gca cat ggg atc cca atc gat ttt ctt gac cgt ctt ctt att atc aca	1068
Ala His Gly Ile Pro Ile Asp Phe Leu Asp Arg Leu Leu Ile Ile Thr	
320 325 330 335	
aca cag cct tac aca caa gac gag atc aga aat att tta gag atc cgt	1116
Thr Gln Pro Tyr Thr Gln Asp Glu Ile Arg Asn Ile Leu Glu Ile Arg	
340 345 350	
tgc caa gaa gag gat gtg gag atg aac gag gaa gcg aaa cag ctt ctg	1164
Cys Gln Glu Glu Asp Val Glu Met Asn Glu Glu Ala Lys Gln Leu Leu	
355 360 365	
act ttg atc gga tgt aat acc tcg ctt agg tac gcg att cat cta atc	1212
Thr Leu Ile Gly Cys Asn Thr Ser Leu Arg Tyr Ala Ile His Leu Ile	
370 375 380	
aat gca gct gcc cta gct tgc ctg aaa cgt aaa ggg aaa gtc gta gag	1260
Asn Ala Ala Ala Leu Ala Cys Leu Lys Arg Lys Gly Lys Val Val Glu	
385 390 395	
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Ile Gln Asp Ile Glu Arg Val Tyr Arg Leu Phe Leu Asp Thr Lys Arg	
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Ser Met Gln Tyr Leu Val Glu His Glu Ser Glu Tyr Leu Phe Ser Val	
420 425 430	
cct ata aaa aac aca cag gag gct act gca gga gaagaaacag aacacgaggc	1409

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1422

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 50 55 60
 Ile Ala Lys Ser Leu Gly Gln Glu Thr Pro Phe Thr Met Ile Ala Gly
 65 70 75 80
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 Ala Phe Arg Lys Ala Ile Gly Val Arg Ile Lys Glu Glu Thr Asp Val
 100 105 110
 Ile Glu Gly Glu Val Val Thr Ile Ser Ile Asp Arg Pro Ala Ser Ser
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 Met Glu Ser Asn Phe Asp Leu Gly Trp Lys Leu Ile Glu Pro Leu Asp
 145 150 155 160
 Lys Glu Lys Val Gln Ser Gly Asp Val Ile Val Leu Asp Arg Phe Cys
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 Gly Lys Ile Thr Lys Leu Gly Arg Ser Phe Thr Arg Ser Arg Asp Phe
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 Asp Val Met Gly Ser Lys Thr Lys Phe Val Gln Cys Pro Glu Gly Glu
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 210 215 220
 Asp Val Ile Asn Ser Arg Thr Gln Gly Tyr Leu Ala Leu Phe Thr Gly
 225 230 235 240
 Asp Thr Gly Glu Ile Arg Ser Glu Thr Arg Glu Gln Ser Asp Thr Lys
 245 250 255
 Val Ala Glu Trp Arg Glu Glu Gly Lys Ala Glu Ile Val Pro Gly Val
 260 265 270
 Leu Phe Ile Asp Glu Val His Met Leu Asp Ile Glu Cys Phe Ser Phe
 275 280 285
 Leu Asn Arg Ala Leu Glu Asn Asp Met Ser Pro Ile Leu Val Val Ala
 290 295 300
 Thr Asn Arg Gly Met Thr Thr Ile Arg Gly Thr Asn Gln Ile Ser Ala
 305 310 315 320
 His Gly Ile Pro Ile Asp Phe Leu Asp Arg Leu Leu Ile Ile Thr Thr
 325 330 335
 Gln Pro Tyr Thr Gln Asp Glu Ile Arg Asn Ile Leu Glu Ile Arg Cys
 340 345 350
 Gln Glu Glu Asp Val Glu Met Asn Glu Glu Ala Lys Gln Leu Leu Thr
 355 360 365
 Leu Ile Gly Cys Asn Thr Ser Leu Arg Tyr Ala Ile His Leu Ile Asn
 370 375 380
 Ala Ala Ala Leu Ala Cys Leu Lys Arg Lys Gly Lys Val Val Glu Ile
 385 390 395 400

Gln Asp Ile Glu Arg Val Tyr Arg Leu Phe Leu Asp Thr Lys Arg Ser
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ctggaattat tttctttttc ttgctctgag ttcacctttt actttgaaaa agattattat 1500
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Gly Val Asp Ala Ala Phe Ser Tyr Lys Tyr Asn Gln Leu His Gly Ile	20	25	30	
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Cys Lys Lys Asp Gly Ile Val Leu Cys Pro Gly Phe Thr Thr Thr His	35	40	45	
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Ser Ile Pro Phe Val Asp Gly Glu Pro Ile Tyr Lys Gly Ser Ser Arg	50	55	60	
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Thr Asn Ile Gly Gly Tyr His Val Thr Asp Tyr Leu Lys Gln Leu Leu	65	70	75	80
tca ctt aag tac cct ttt cat tcg tct agg ttt aca tgg gag aag gcc				288
Ser Leu Lys Tyr Pro Phe His Ser Ser Arg Phe Thr Trp Glu Lys Ala	85	90	95	
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Glu Asp Leu Lys Leu Glu His Cys Tyr Ile Ala Pro Asp Tyr Ala Ser	100	105	110	
gaa att cgg tta ttc cag gaa gga aga aaa gaa gct gaa gag aaa aca				384
Glu Ile Arg Leu Phe Gln Glu Gly Arg Lys Glu Ala Glu Glu Lys Thr	115	120	125	
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Ser Tyr Trp Gln Leu Pro Trp Ile Pro Pro Pro Thr Glu Val Pro Pro	130	135	140	
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Ser Glu Glu Glu Ile Ala Arg Lys Ala Ala Ile Arg Glu Lys Gln Gly	145	150	155	160
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Gln Arg Leu Arg Glu Met Ala Glu Ala Lys Arg Val Ser Lys Ile Asn	165	170	175	
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Asp Met Glu Asn Gln Leu Ile Ser Leu Arg Phe Leu Leu Lys Gln Val	180	185	190	
gac cag gtt gaa gag gat gat att cca acc ttt ttg tca gac acc ggt				624
Asp Gln Val Glu Glu Asp Asp Ile Pro Thr Phe Leu Ser Asp Thr Gly	195	200	205	
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Tyr Ala Ser Arg Gln Glu Leu Glu Ser Thr Ile Thr Lys Val Thr Gln	210	215	220	
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Ser Leu Arg Lys Ala Arg Gly Glu Pro Lys Asn Glu Pro Ala Glu Tyr	225	230	235	240
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Glu Glu Asn Pro Asp Ser Leu Asn Asn Glu Lys Tyr Pro Leu Met Asn	245	250	255	

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Gln	Met	Phe	Leu	Lys	Thr	Thr	Ala	Glu	Gly	Arg	Leu	Arg	Ala	Arg	Gln	
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Lys	Arg	Asn	Glu	Glu	Glu	Leu	Glu	Lys	Glu	Lys	Arg	Asn	Gln	Leu	Glu	
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Ala	Gln	Tyr	Lys	Glu	Val	Leu	Glu	Arg	Val	Glu	Gln	Lys	Lys	Arg	Leu	
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Lys	Thr	Asn	Gly	Ser	Ser	Asn	Gly	Asn	Asn	Lys	Ser	Gly	Gly	Ile	Gly	
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gat	gat	gac	gaa	caa	cct	gat	tca	gac	gag	gca	gag	ttg	gct	cgt	tta	1248
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Thr	Glu	Glu	Asp	Tyr	Lys	Ile	Val	Ile	Gly	Ile	Glu	Arg	Phe	Arg	Cys	
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Cys Ser Leu Leu Pro Gly Met Asn Glu Arg Leu Glu Cys Gly Ile Arg	
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Met Ile Arg Pro Cys Gly Ser Pro Ile Asn Val Val Arg Ala Met Asp	
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Pro Val Leu Asp Ala Trp Arg Gly Ala Ser Ala Phe Ala Ala Asn Leu	
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Ser Leu Arg Lys Ala Arg Gly Glu Pro Lys Asn Glu Pro Ala Glu Tyr	

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Gln	Met	Phe	Leu	Lys	Thr	Thr	Ala	Glu	Gly	Arg	Leu	Arg	Ala	Arg
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Lys	Thr	Asn	Gly	Ser	Ser	Asn	Gly	Asn	Asn	Lys	Ser	Gly	Gly	Ile
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Arg Leu Trp Ile Phe Tyr Leu Gln Cys Ser Gln Glu Pro Trp Asp Ser	
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Ile Phe Phe Ala Glu Thr Ser Leu Arg Ser Gly Tyr Pro Leu Arg Met	
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Ile Ser Ser Gln Ser Gly Glu Leu Ser Phe Met His Ile Tyr Ser Gln	
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Cys Lys Phe Gly Trp Ser Lys Tyr Ala Ser Pro Ser Gly Arg Ser Ala	
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Met Gln Pro Ile Val Val Ser Leu Pro Leu Cys His Phe Asp Asp Thr	
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Val Phe Glu Asp Val Thr Leu Asp Pro Ile Glu Arg Gly Leu Ile Arg	
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Leu Cys Thr Pro Lys Ala Ile Arg Glu Gln Leu Val Gln Leu Met Phe	
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Asn Leu Gly Met Tyr Ser Ala Trp Val Gly Gly Ala Ile Leu Ala Lys	
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Val Val Phe Pro Gln Asn Gln His Val Thr Lys Ala Asp Tyr Asp Glu	
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Asp Trp Asp Ala Met Glu Asp Leu Leu Arg Tyr Val Val Tyr Thr Gly	

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Phe	Ala	Gln	Glu	Leu	Gly	Lys	Thr	Asn	Pro	Ser	Met	Asn	Leu	Ser	Met
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Asn	Leu	Gly	Met	Tyr	Ser	Ala	Trp	Val	Gly	Gly	Ala	Ile	Leu	Ala	Lys
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Lys	Thr	Val	Ala	Pro	Thr	Gln	Ile	Leu	Ser	Glu	Arg	Gly	Ala	Asn	Leu	
			20					25					30			
gtt gtc atc aac tta ggg tct gct aat gta aga gta gga ttg gct atg																144
Val	Val	Ile	Asn	Leu	Gly	Ser	Ala	Asn	Val	Arg	Val	Gly	Leu	Ala	Met	
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gat	gag	aaa	cct	ttc	aat	gtt	cct	aat	tgt	att	gca	aga	tac	att	aca	192
Asp	Glu	Lys	Pro	Phe	Asn	Val	Pro	Asn	Cys	Ile	Ala	Arg	Tyr	Ile	Thr	
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Gln	Ser	Gly	Lys	Pro	Thr	Val	Val	Asp	Gln	Met	Leu	Asn	Thr	Glu	Val	
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Thr	Thr	Asn	Gln	His	Val	Asp	Arg	Glu	Arg	Ala	Tyr	Asn	Ser	Ala	Ala	
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tcg	ctg	ttg	aag	ata	ctg	ttc	ctg	gat	gaa	agt	tct	tct	tct	ggc	tct	336
Ser	Leu	Leu	Lys	Ile	Leu	Phe	Leu	Asp	Glu	Ser	Ser	Ser	Ser	Gly	Ser	
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gca	tct	cgc	aag	atg	ggg	agg	atc	gac	gga	tac	aat	caa	gcg	agt	acg	384
Ala	Ser	Arg	Lys	Met	Gly	Arg	Ile	Asp	Gly	Tyr	Asn	Gln	Ala	Ser	Thr	
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Ile	Lys	Lys	Asp	Ser	Val	Phe	Thr	Trp	Thr	Asp	Val	Tyr	Glu	Asp	Glu	
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Lys	Ile	Ser	Leu	Ala	Ser	Pro	Ala	Glu	Thr	Ser	Pro	Asp	Lys	Gly	Asp	
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gct	agt	gca	tct	gaa	gct	gtt	cct	gat	gtt	act	gac	tct	aaa	gat	act	528
Ala	Ser	Ala	Ser	Glu	Ala	Val	Pro	Asp	Val	Thr	Asp	Ser	Lys	Asp	Thr	
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agt	gag	agt	aaa	cgc	aag	tat	agg	aaa	atg	att	ttt	ggg	gaa	gaa	gct	576
Ser	Glu	Ser	Lys	Arg	Lys	Tyr	Arg	Lys	Met	Ile	Phe	Gly	Glu	Glu	Ala	
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Leu	Lys	Ile	Ser	Pro	Lys	Glu	Pro	Tyr	Cys	Leu	Tyr	His	Pro	Ile	Arg	
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Arg	Gly	His	Phe	Asn	Val	Ser	Pro	His	Tyr	Ser	Ala	Gln	Arg	Val	Cys	
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Glu	Asp	Leu	Thr	Ala	Ile	Leu	Asp	Trp	Ile	Leu	Leu	Glu	Lys	Leu	His	
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Ile	Thr	His	Lys	Glu	Arg	Phe	Ser	Phe	His	Ala	Val	Ile	Val	Val	Pro	
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gaa	aca	ttt	gac	acc	cgc	gaa	ata	aag	gaa	atg	cta	act	att	gtg	ttg	816
Glu	Thr	Phe	Asp	Thr	Arg	Glu	Ile	Lys	Glu	Met	Leu	Thr	Ile	Val	Leu	
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gga	gag	cta	tac	ttt	aac	tca	gca	gtt	gtc	cac	caa	gaa	ggg	cta	tcg	864
Gly	Glu	Leu	Tyr	Phe	Asn	Ser	Ala	Val	Val	His	Gln	Glu	Gly	Leu	Ser	
		275					280					285				

gcc gtt ttt ggg aat ggt ttg aca aca gct tgt att gtg aat ata gga	912
Ala Val Phe Gly Asn Gly Leu Thr Thr Ala Cys Ile Val Asn Ile Gly	
290 295 300	
gcc cag aca agt aca gta gtt tgt gtc gag gat ggg gtc tca ttg cca	960
Ala Gln Thr Ser Thr Val Val Cys Val Glu Asp Gly Val Ser Leu Pro	
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Asn Thr Glu Lys Ile Leu Pro Phe Gly Gly Glu Asp Ile Cys Arg Cys	
325 330 335	
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Leu Leu Trp Ile Gln Arg His Tyr Gln Lys Trp Pro Gln Ile Asn Thr	
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gat gtt ttg gca aag cca atc gat atg ctg atg ctt aat caa ctt aag	1104
Asp Val Leu Ala Lys Pro Ile Asp Met Leu Met Leu Asn Gln Leu Lys	
355 360 365	
gag tca ttt tgt gaa att aga gca gga gaa ctt gaa act gtt gca acg	1152
Glu Ser Phe Cys Glu Ile Arg Ala Gly Glu Leu Glu Thr Val Ala Thr	
370 375 380	
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Val His Ser Tyr Glu Glu Gly Met Pro Ala Val Pro His Lys Thr Asn	
385 390 395 400	
ctc acc tcc ctt aac gtt cca cca atg ggt ctg ttt tat cct aac ctt	1248
Leu Thr Ser Leu Asn Val Pro Pro Met Gly Leu Phe Tyr Pro Asn Leu	
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Leu Val Pro Glu Ile Phe Pro Gln Pro Pro Arg Gln Trp Phe Gln Asp	
420 425 430	
tac gag aat atg ttg gaa gac act tgg aac atg gac ttt gga ggt ggt	1344
Tyr Glu Asn Met Leu Glu Asp Thr Trp Asn Met Asp Phe Gly Gly Gly	
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ggt aac atg gga tta cca atg tgg gat agt ttt gca ttt tcg cct tca	1392
Gly Asn Met Gly Leu Pro Met Trp Asp Ser Phe Ala Phe Ser Pro Ser	
450 455 460	
aaa cca aag aaa gaa gag aag att ggt ctc gct gaa gcc att aca agc	1440
Lys Pro Lys Lys Glu Glu Lys Ile Gly Leu Ala Glu Ala Ile Thr Ser	
465 470 475 480	
agc att ctc tct gct gga cgc ata gac ctt aga cgg aag ctt ttc tcc	1488
Ser Ile Leu Ser Ala Gly Arg Ile Asp Leu Arg Arg Lys Leu Phe Ser	
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Ser Ile Gln Leu Ile Gly Gly Ala Gly Leu Thr Lys Gly Leu Val Ala	
500 505 510	
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Ala Val Glu Glu Arg Val Leu His Ala Ile Pro Pro Thr Glu Ala Ile	
515 520 525	
gat aca gtg cag gtt ctg cca tca aga acg gag cca caa ttc gta act	1632

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Trp	Lys	Gly	Gly	Ala	Ile	Leu	Gly	Ile	Leu	Asp	Phe	Gly	Arg	Glu	Ala		
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Trp	Ile	Glu	Arg	His	Gln	Trp	Met	Val	Asn	Gly	Val	Asn	Lys	Gly	Gly		
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cta	aag	aag	tac	aaa	gac	tct	tat	cac	ctt	caa	ggg	caa	gca	atg	tac	1776	
Leu	Lys	Lys	Tyr	Lys	Asp	Ser	Tyr	His	Leu	Gln	Gly	Gln	Ala	Met	Tyr		
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Gln	Ser	Gly	Lys	Pro	Thr	Val	Val	Asp	Gln	Met	Leu	Asn	Thr	Glu	Val		
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Ala	Ser	Arg	Lys	Met	Gly	Arg	Ile	Asp	Gly	Tyr	Asn	Gln	Ala	Ser	Thr		
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Ser	Glu	Ser	Lys	Arg	Lys	Tyr	Arg	Lys	Met	Ile	Phe	Gly	Glu	Glu	Ala		
			180					185					190				
Leu	Lys	Ile	Ser	Pro	Lys	Glu	Pro	Tyr	Cys	Leu	Tyr	His	Pro	Ile	Arg		
		195				200						205					
Arg	Gly	His	Phe	Asn	Val	Ser	Pro	His	Tyr	Ser	Ala	Gln	Arg	Val	Cys		
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Glu	Asp	Leu	Thr	Ala	Ile	Leu	Asp	Trp	Ile	Leu	Glu	Lys	Leu	His			
225					230					235				240			
Ile	Thr	His	Lys	Glu	Arg	Phe	Ser	Phe	His	Ala	Val	Ile	Val	Val	Pro		
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Glu	Thr	Phe	Asp	Thr	Arg	Glu	Ile	Lys	Glu	Met	Leu	Thr	Ile	Val	Leu		
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Gly	Glu	Leu	Tyr	Phe	Asn	Ser	Ala	Val	Val	His	Gln	Glu	Gly	Leu	Ser		

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Ala Val Phe Gly Asn Gly Leu Thr Thr Ala Cys Ile Val Asn Ile Gly		
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Ala Gln Thr Ser Thr Val Val Cys Val Glu Asp Gly Val Ser Leu Pro		
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Asn Thr Glu Lys Ile Leu Pro Phe Gly Gly Glu Asp Ile Cys Arg Cys		
325	330	335
Leu Leu Trp Ile Gln Arg His Tyr Gln Lys Trp Pro Gln Ile Asn Thr		
340	345	350
Asp Val Leu Ala Lys Pro Ile Asp Met Leu Met Leu Asn Gln Leu Lys		
355	360	365
Glu Ser Phe Cys Glu Ile Arg Ala Gly Glu Leu Glu Thr Val Ala Thr		
370	375	380
Val His Ser Tyr Glu Glu Gly Met Pro Ala Val Pro His Lys Thr Asn		
385	390	395
Leu Thr Ser Leu Asn Val Pro Pro Met Gly Leu Phe Tyr Pro Asn Leu		
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Leu Val Pro Glu Ile Phe Pro Gln Pro Pro Arg Gln Trp Phe Gln Asp		
420	425	430
Tyr Glu Asn Met Leu Glu Asp Thr Trp Asn Met Asp Phe Gly Gly Gly		
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Gly Asn Met Gly Leu Pro Met Trp Asp Ser Phe Ala Phe Ser Pro Ser		
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Lys Pro Lys Lys Glu Glu Lys Ile Gly Leu Ala Glu Ala Ile Thr Ser		
465	470	475
Ser Ile Leu Ser Ala Gly Arg Ile Asp Leu Arg Arg Lys Leu Phe Ser		
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Ser Ile Gln Leu Ile Gly Gly Ala Gly Leu Thr Lys Gly Leu Val Ala		
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Ala Val Glu Glu Arg Val Leu His Ala Ile Pro Pro Thr Glu Ala Ile		
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Asp Thr Val Gln Val Leu Pro Ser Arg Thr Glu Pro Gln Phe Val Thr		
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Trp Lys Gly Gly Ala Ile Leu Gly Ile Leu Asp Phe Gly Arg Glu Ala		
545	550	555
Trp Ile Glu Arg His Gln Trp Met Val Asn Gly Val Asn Lys Gly Gly		
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